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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/551,264

08/08/2006

Ken Taniwaki

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EXAMINER

CHORBAJI, MONZER R

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/551,264	Applicant(s) TANIWAKI ET AL.	
	Examiner MONZER R. CHORBAJI	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/28/05 & 6/15/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is a first action on the merits having a filing date of 8/8/06

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Rajamannan (U.S.P.N. 5,287,818).

Regarding claim 1, Rajamannan discloses a soil processing method (col.1, lines 6-8) comprising making a microwave radiator move into soil (col.1, lines 36-41), and thereafter radiating microwaves from the microwave radiator to soil to be processed.

Regarding claim 5, Rajamannan discloses that the radiating microwaves underground from a microwave radiator moving at a predetermined depth under the ground (col.2, lines 52-53 and Table 1, where, for example, a predetermined depth is considered 3 inches).

As to the limitation that the soil to be sterilized is sterilized along a locus of travel of the microwave radiator; Rajamannan teaches moving the apparatus through the soil (col.1, lines 36-40, where the area of the soil that the apparatus covers is considered the location or locus) where a location of travel has been irradiated with microwave.

Regarding claim 4, Rajamannan teaches that radiation of microwaves is performed while the microwave radiator moved into the soil is being moved generally in a horizontal direction (col.1, lines 36-37 and col.2, lines 50-53).

Regarding claim 6, Rajamannan discloses that the direction of radiation of microwaves radiated underground from the microwave radiator is substantially horizontally set (col.1, lines 36-38 and Table I in column 2), whereby soil to be sterilized is sterilized in a predetermined depth range.

Regarding claim 8, Rajamannan discloses that the plurality of microwave radiators (figure 1) are pulled (col.2, lines 50-53) in a vertical position that is perpendicular to the horizontal direction of travel.

As to the limitation that the radiators are placed at a suitable distance from each other whereby soil to be sterilized is sterilized through a predetermined width along the soil surface with the travel of the microwave radiators; one recognizes that the plurality of the microwave radiators are rigidly connected to the agricultural implements at a certain distance from each other in order to pull them through soil so that a soil area having a predetermined width and length is sterilized with the microwave radiations.

3. Claims 13-15, 17 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Wayland, Jr. et al. (U.S.P.N. 4,092,800).

Regarding claim 13, Wayland discloses a soil processing apparatus (figure 1) comprising a farm traveling unit (figure 1:10) having an underground traveling portion (figure 4:18, 42 and 40) and an overground traveling portion (figure 1:14), a microwave

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radiator (figure 4:18) incorporated in the underground traveling portion of the farm traveling unit (10), a microwave generation source (figure 2:30) held in the overground traveling portion (figure 1:14) of the farm traveling unit, and a waveguide (figure 1:16) connecting the microwave generation source (figure 1:14) held in the overground traveling portion and the microwave radiator (figure 1:18) held in the underground traveling portion.

Regarding claim 14, Wayland teaches that the farm traveling unit (10) has a plurality of the underground traveling portions (figure 4:18, 42 and 40) that are capable of being placed (depending on the length of waveguide 16) at a suitable distance from each other in a direction (facing toward the soil) perpendicular to the direction of travel (horizontal direction), and the microwave radiator (18) is incorporated in each underground traveling portion.

Regarding claim 15, Wayland teaches that a radiation center axis of the microwave radiator is directed in a substantially horizontal direction (one is capable of holding radiator 18 having the flexible waveguide 16d in a horizontal direction directed toward the surface of the soil in a perpendicular horizontal direction to the horizontal movement direction of vehicle 10) in a direction perpendicular to the direction of travel.

Regarding claim 17, Wayland discloses that the soil processing apparatus further includes a travel depth adjustment tool (considered waveguide flexible section 16d as shown in figure 2, which is capable, depending on its length, of adjusting the depth of radiator 18) for adjusting the travel depth of the underground traveling portions.

Regarding claim 20, Wayland discloses that the farm traveling unit is of a self-propelled type (figure 1:10 and col.2, lines 5-8).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2-3, 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajamannan (U.S.P.N. 5,287,818).

In claim 2 and as to the limitation that the radiation of microwaves is performed while the microwave radiator moved into the soil is being maintained at rest; Rajamannan discloses irradiating the soil at a depth of 36" (Table I) while moving the plurality of the microwave generators. However, one would recognize that depending on the level of soil contamination with pathogens in a certain location within the soil and also on the resistance of such pathogens to microwave radiation, to stop the agriculture implement (for example, tractor) and to apply more irradiation dosage to the soil in order to insure the complete killings of the pathogens in the soil. It would have been obvious to one of ordinary skill in the art at the time of the invention to stop the agriculture vehicle and irradiate the soil in order to insure the complete killings of the pathogens in the soil.

In claim 3 and as to the limitation that the radiation of microwaves is performed while the microwave radiator moved into the soil is being move generally in a vertical direction; Rajamannan discloses irradiating the soil at a depth of 36" (Table I) while moving the plurality of the microwave generators. However, one would recognize that depending on the level of soil contamination with pathogens in a certain location within the soil and also on the resistance of such pathogens to microwave radiation, to stop the agriculture implement (for example, tractor) and to apply more irradiation dosage to the soil in vertical direction in order to insure the complete killings of the pathogens in the soil. It would have been obvious to one of ordinary skill in the art at the time of the

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invention to stop the agriculture vehicle and irradiate the soil in vertical direction in order to insure the complete killings of the pathogens in the soil.

In claim 7 and as to the limitation that the microwave is made to travel underground two times or more along one travel locus at different depths, whereby a continuous mass of soil at a predetermined depth from the soil surface is sterilized with the travel of the microwave radiator; Rajamannan discloses irradiating the soil at a multiple depth values (Table I) while moving the plurality of the microwave generators. However, one would recognize that depending on the level of soil contamination with pathogens in a certain location within the soil and also on the resistance of such pathogens to microwave radiation, to irradiate the soil two or more times along one travel location at different depths so that a continuous mass of soil at a predetermined depth from the soil surface is sterilized with the travel of the microwave radiator in order to insure the complete killings of the pathogens in the soil. It would have been obvious to one of ordinary skill in the art at the time of the invention to irradiate the soil two or more times at different depths in order to insure the complete killings of the pathogens in the soil.

In claim 12 and as to the limitation that the depth of soil to be increased in temperature corresponds to a depth range in which a root vegetable is planted; Rajamannan irradiates pathogens within the soil so that crops grow in healthy soil without acquiring diseases due to such pathogens. In addition, Rajamannan teaches irradiating the soil at a multiple depth values (Table I) while moving the plurality of the microwave generators. As such one recognizes the various depths disclosed by

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Rajamannan includes depth ranges for planting roots of vegetables. It would have been obvious to one of ordinary skill in the art at the time of the invention to irradiate the soil at depth ranges that are suitable for planting roots of vegetables so that crops can grow in healthy soil without acquiring diseases due to the presence of soil pathogens.

8. Claims 9, 11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajamannan (U.S.P.N. 5,287,818) as applied to claims 8,5 and further in view of Davis (U.S.P.N. 2,064,522).

Regarding claim 9, Rajamannan fails to teach that adjacent pair of microwave radiators are placed so that their radiation surfaces face each other, whereby superimposed electric fields of microwaves are formed between the pair of microwave generators.

Davis discloses a method for irradiating various crop materials with high frequency electrical oscillations (page 1, left column, lines 1-5) where electrodes surfaces face each other (figure 1:1, 2 and page 2, left column, lines 29-33) so that insects and their larvae may be economically and reliably destroyed without injuring the characters of the material being treated (page 1, right column, lines 30-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Rajamannan with the microwave generators facing each other so that insects and their larvae may be economically and reliably destroyed without injuring the characters of the material being treated as explained by Davis (page 1, right column, lines 30-33).

Regarding claim 11, Rajamannan fails to disclose a soil treatment temperature. Davis discloses a method for irradiating various crop materials with high frequency electrical oscillations (page 1, left column, lines 1-5) where the soil temperature is increased to a value of 140° F (page 3, left column, lines 20-27; 140° F= 60° C) since at such a temperature the insects, their eggs, larvae or pupae are destroyed (page 3, left column, lines 25-26). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Rajamannan with the lethal temperature since at such a temperature the insects, their eggs, larvae or pupae are destroyed as explained by Davis (page 3, left column, lines 25-26).

Regarding claim 18, Rajamannan fails to teach using a shielding member with his apparatus.

Davis discloses an apparatus (figure 1) for irradiating various crop materials with high frequency electrical oscillations (page 1, left column, lines 1-5) where shield plates (figure 1:11) are used in order to increase the efficiency of the treatment operation (page 2, right column, lines 5-12). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Rajamannan with the shield plates in order to increase the efficiency of the treatment operation as explained by Davis (page 2, right column, lines 5-12).

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rajamannan (U.S.P.N. 5,287,818) as applied to claim 5 and further in view of Schmidt (U.S.P.N. 5,422,074).

Rajamannan teaches adding chemical or biological soil conditioners to the soil prior to its irradiation (col.1, lines 30-33 and lines 60-61). However, Rajamannan fails to teach adding fertilizers.

Schmidt discloses a method for processing and disinfecting waste material (col.4, lines 30-32) where the treated liquid phase of the disinfected material includes plant nutrients that is useful for direct applications to the soil as a liquid fertilizer (col.8, lines 25-30) since this liquid fertilizer includes valuable plant nutrients (col.8, lines 25-26). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the method in Rajamannan with the fertilizer since it includes valuable plant nutrients that is useful for direct application to the soil as shown by Schmidt (col.8, lines 25-30).

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wayland, Jr. et al. (U.S.P.N. 4,092,800) as applied to claim 15 and further in view of Davis (U.S.P.N. 2,064,522).

Wayland fails to teach that the microwave transmitters respectively incorporated in an adjacent pair of the underground traveling portions face each other.

Davis discloses an apparatus for irradiating various crop materials with high frequency electrical oscillations (figure 1) where electrodes surfaces face each other (figure 1:1, 2 and page 2, left column, lines 29-33) so that insects and their larvae may be economically and reliably destroyed without injuring the characters of the material being treated (page 1, right column, lines 30-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus in Wayland

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with the microwave generators facing each other so that insects and their larvae may be economically and reliably destroyed without injuring the characters of the material being treated as explained by Davis (page 1, right column, lines 30-33).

11. Claim 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wayland, Jr. et al. (U.S.P.N. 4,092,800) in view of Rajamannan (U.S.P.N. 5,287,818).

Wayland fails to teach that the farm traveling unit is of a pulled type.

Rajamannan discloses a plurality of microwave generating devices (figure 1) that are of the pulled type (col.2, lines 50-53) so that the multiple generators can be pulled at a depth from approximately 3" to 36" (col.2, lines 52-53). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus in Wayland with a farm tractor so that the multiple generators can be pulled at a depth from approximately 3" to 36" as explained by Rajamannan (col.2, lines 52-53).

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rajamannan (U.S.P.N. 5,287,818) in view of Wayland, Jr. et al. (U.S.P.N. 4,092,800).

Rajamannan teaches a farming instrument (10) applied to a soil processing method (col.1, lines 6-8) including making a microwave radiator move into soil (col.1, lines 36-38), and thereafter radiating microwaves from the microwave radiator to the soil to be processed (col.1, lines 51-56), the farming instrument comprising:

being formed as a structural body capable of being thrust into soil generally in a vertical direction (the shovel 12 is capable of being thrust vertically into soil);

a sharpened portion (unlabeled fore sharp end portion of shovel 12) for thrusting is provided on a fore end portion;

a microwave radiation port (unlabeled rectangular openings enclosed by domes 13a that are positioned in the unlabeled side surface of the elongate flexible shank 11) provided in a side surface of the fore end portion (unlabeled fore sharp end portion of shovel 12);

a microwave inlet provided in a rear end portion (considered the unlabeled opening where cable 14 enters the device at unlabeled rear end portion), whereby the farming instrument (10) is capable of thrusting into a desired spot in a farm to radiate microwaves to soil at a predetermined depth.

Rajamannan fails to disclose a waveguide incorporated to guide microwaves from the microwave inlet to the microwave transmission port.

Wayland discloses a microwave irradiating vehicle (figure 1) that includes waveguides (figure 1:16) incorporated to guide microwaves from the microwave inlet (figure 2:16a) to the microwave transmission port (figure 2:16d and 16c) since such a device provides inexpensive vegetation control (col.1, lines 39-42). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the instrument in Rajamannan with the waveguide since such a device provides inexpensive vegetation control as explained by Wayland (col.1, lines 39-42).

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MONZER R. CHORBAJI whose telephone number is (571)272-1271. The examiner can normally be reached on M-F 9:00-5:30.

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. R. C./

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797